

## Abstract of the Disclosure

A combined cycle gas turbine system is improved to enhance a gas turbine efficiency and a combined efficiency by effecting steam-cooling of a combustor transition piece and a turbine blade. The combined cycle system has a gas turbine (8) having a generator (1), a compressor (2), a combustor (3), a blade cooling air cooler (4) and a turbine (6), a steam turbine (29) having a high pressure turbine (21), an intermediate pressure turbine (22) and a low pressure turbine (23), and a waste heat recovery boiler (9). Saturated water of a high pressure pump (27) is partially led into a demineralizer (118) and a water sprayer (116) for cooling steam to be supplied into a moving blade (52). The steam, after being used for cooling, is recovered into a reheater (20). Outlet steam of the high pressure turbine (21) is led into a stationary blade (53) for cooling thereof and the steam is then recovered into an inlet of the intermediate pressure turbine (22). Also, steam of an intermediate pressure superheater (16) is led into a combustor transition piece (54) for cooling thereof and the steam is recovered into the inlet

of the intermediate pressure turbine (22). Thus, moving blade cooling steam is reduced and the combined efficiency is enhanced.